CHAPTER 3
AFFECTED ENVIRONMENT

This section discusses the existing physical, natural, and cultural environments on the VNTR property. The following descriptions of the existing environment are based in part on information presented in the *Final Programmatic Environmental Assessment for Continued Non-Explosive Use of Vieques Inner Range to Include Operations Typical of Large Scale Exercises, Multiple Unit Level Training and/or a Combination of Large Scale Exercises and Multiple Unit Level Training* (US Navy 2001a), which provided detailed descriptions of the environmental conditions on Vieques; *Supplement to the Final Environmental Assessment for Continued Non-Explosive Use of Vieques Inner Range to Include Operations Typical of Large Scale Exercises, Multiple Unit Level Training and/or a Combination of Large Scale Exercises and Multiple Unit Level Training* (US Navy 2002a), *Land Use Management Plan for U.S. Naval Facilities* (US Navy 1996); *Final Environmental Assessment for Transfer of the Naval Ammunition Support Detachment Property* (US Navy 2000); *Biological Assessment for Continuing Training Activities on the Inner Range, Vieques, Puerto Rico* (US Navy 2001b); and *Ex-USS Killen Site Investigation and Biological Characterization, Vieques Island, Naval Station Roosevelt Roads, Puerto Rico* (US Navy 2002e). The region of influence (ROI) will be used to delineate the extent of analysis and identify the affected environment. For example, the ROI for terrestrial resources includes those lands that would be impacted by Navy activities at VNTR.

3.1 LAND USE

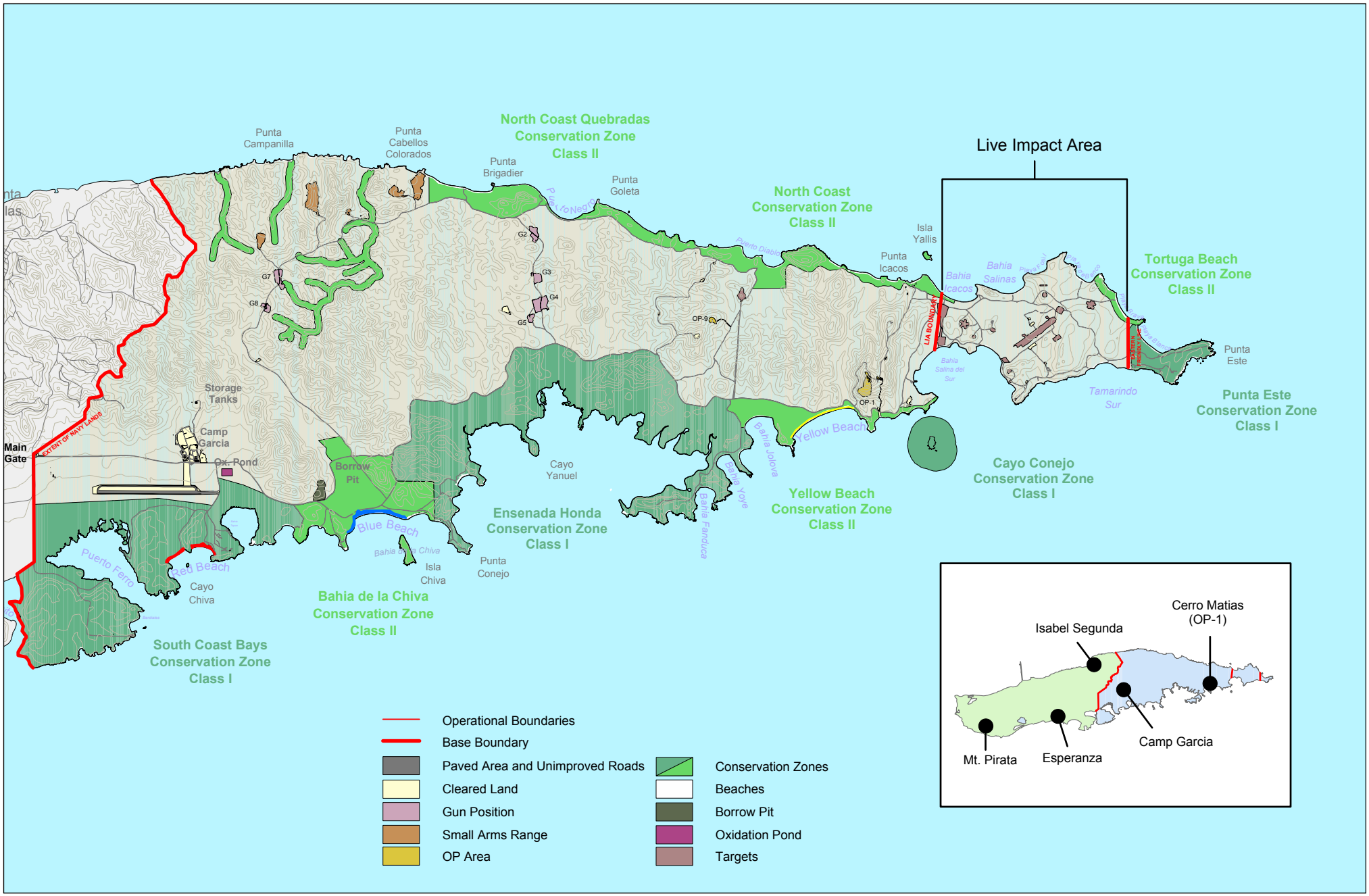
Land Use on the Vieques Naval Training Range. The VNTR property includes approximately 14,500 acres (5,868 ha) of the eastern end of Vieques (Figure 3-1). The primary mission of the VNTR is to provide training opportunities for Atlantic Fleet units. Naval use of the VNTR property has required only minimal development in support of operations. Furthermore, VNTR operations have precluded outside development from occurring on the property and have resulted in much of the area remaining undeveloped. A summary of existing land use at the VNTR is provided in Table 3-1.

Table 3-1. Existing Land Use at the VNTR Property

Existing Land Use	*Acres (Hectares)*
Undeveloped maneuver area	10,328 (4,180)
Conservation Zones	2,909 (1,177)
Live Impact Area	900 (364)
Camp Garcia Compound	240 (97)
Camp Garcia Airfield	79 (32)
Small Arms Ranges	44 (18)
Total	14,500 (5,868)

Source: US Navy 1996

The undeveloped portions of the VNTR property consist of various natural communities. Within the maneuver area, this consists primarily of dense thorn scrub and lowland/upland gallery forest vegetation. A series of mangrove forests and beaches line the various bays and lagoons around the northern and southern coastal zones. Red and Blue Beaches are located on the southern coast near Camp Garcia, and prior to 1999 were popular recreational beaches for the general public.



M:\Military\Vequez\Ranges\Figure_3-1

2 1 0 2 Kilometers

1 0.5 0 1 Miles

Figure 3-1
Land Use

N
W E
S

Conservation Zones were established on Navy lands on Vieques in accordance with the 1983 Memorandum of Understanding (MOU) between the Commonwealth of Puerto Rico and the Navy. Four of these zones are located within the VNTR property and are identified as Class I Conservation Zones (i.e., areas that are to be protected from damaging activities and managed to preserve and maintain their natural values). These Class I areas are:

- The South Coast Bays Conservation Zone includes extensive mangroves adjacent to Puerto Mosquito, Puerto Ferro, Bahia Corcho, and Bahia Tapon. The Conservation Zone ensures that the three bays (Bahia Tapon, Puerto Ferro, and Puerto Mosquito) maintain their bioluminescent qualities. The South Coast Bays Conservation Zone is located along the southwest coast of the VNTR. (1,233 acres [499 ha]);
- Ensenada Honda Conservation Zone is located along the south central coast of the VNTR and serves to protect one of the island's last remaining stands of ucar trees (*Bucida buceras*). (1,483 acres [600 ha]);
- Cayo Conejo Conservation Zone is a small island located near the southwest corner of the LIA, and is important as a nesting habitat for the federally listed endangered brown pelican. (74 acres [30 ha]); and
- Punte Este Conservation Zone is located on the far eastern tip of Vieques and serves to protect a drought resistant evergreen scrub community. (119 acres [48 ha]) (US Navy 1996).

Additional conservation classes were recommended as part of the 1986 Land Use Management Plan (LUMP) to protect other unique or sensitive areas (US Navy 1996). As part of these recommendations, five areas (North Coast, North Coast Quebradas, Tortuga Beach, Yellow Beach, and Bahia de la Chiva), were designated as Class II Conservation Zones. Class II Conservation Zones are designated to protect environmentally sensitive, but not critical, habitats and natural areas. Compatible military and civilian uses are permitted within Class II Conservation Zones with certain restrictions.

Civilian access to the undeveloped portions of the VNTR is currently limited for security reasons. Certain civilian activities, such as recreational beach-related activities, land crabbing, and fishing, were permitted on Navy property until April 1999. Visitors were required to obtain a pass from the main VNTR gate upon entering the property and to follow all of the rules and regulations for the area. However, following the death of a Navy employee on the VNTR during ATG exercises at the LIA, the VNTR was overrun with trespassers protesting against Navy use of the VNTR. After removing all protestors from Navy property, the Navy secured the VNTR and has prohibited access to civilians not performing official business on VNTR.

Developed areas on the VNTR property mainly consist of support facilities for military operations. These facilities include the following:

- The Camp Garcia compound (240 acres [97 ha]), located in the western section of the VNTR property and consisting of approximately 28 permanent and temporary buildings that include offices, a fire truck shelter, vehicle maintenance facilities, and barracks;

- The Camp Garcia airstrip is located in the southwestern portion of the VNTR. The airstrip is 4,898 feet (1,493 m) long and is used primarily as a helicopter landing area. The airstrip is currently closed to fixed wing aircraft;
- Observation Post (OP)-1 is located on Cerro Matias and is the main facility on Vieques for controlling training operations at the VNTR. OP-1 and associated facilities includes an approximately 10,000 square-foot (930 m^2) range operations center (ROC) and various ancillary structures such as equipment storage and maintenance buildings, water tanks, a fueling station, antennas, remote scoring devices, and fences;
- Several small arms training ranges located along the north central coast of the VNTR; and
- Various other facilities scattered throughout the VNTR including guard houses, observation towers, water storage tanks, roads, and fences.

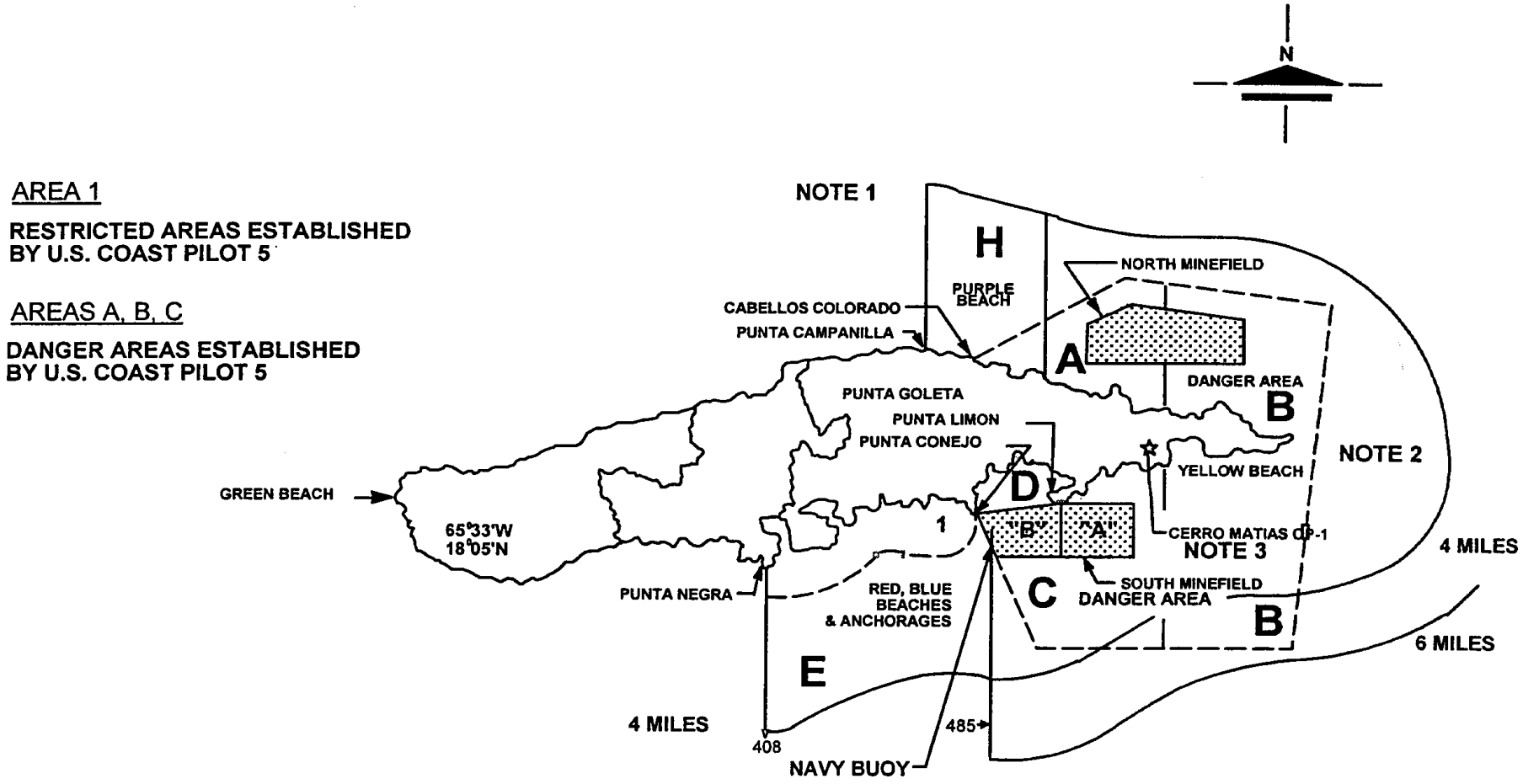
Surrounding Land Use. The VNTR property is bounded by the Caribbean Sea to the south and the Atlantic Ocean to the north. The waters surrounding the VNTR are subject to various administrative controls and restrictions. U.S. Coast Pilot 5 defines restricted areas, danger areas, and a 4-nautical mile limit surrounding the VNTR (Figure 3-2). Certain areas are activated during Navy exercises, depending on the training activities being conducted. In accordance with the 1983 MOU, prior to each week of exercises, the Navy publishes a "Warning to Fishermen and Other Persons Using the Waters Surrounding Vieques" that identifies which restricted or danger areas are activated for each day. Public access to those waters is prohibited during training activities.

The civilian portion of Vieques bounding the western border of the VNTR property is a mixture of developed and rural land. Isabel Segunda, located adjacent to the northwest corner of the VNTR, is the main population center on the island. Scattered natural areas, agricultural fields, and rural residences are located along the southwest boundary of the VNTR. Esperanza is located approximately 3 miles (4.83 km) west of the VNTR property on the southern coast.

Existing Land Use Plans and Land Development Regulations. In 1983, the Navy and Commonwealth of Puerto Rico developed an MOU that outlines plans regarding development, land use, environmental protection, and community assistance for Vieques. A major part of the MOU is the designation of unique or significant ecological areas as Conservation Zones. Another intent of the MOU is to maximize compatible civilian uses on Navy land that would economically benefit the local population. Until recently, a lease program was in place to allow for limited civilian uses considered to be compatible with military operations, such as cattle grazing, agriculture, and forestry. VNTR lands no longer are used for grazing or agricultural leases.

3.2 SOCIOECONOMICS

This section provides a brief background summary of existing socioeconomic conditions on Vieques, including population and housing, the economy and industry, employment and income, recreation, infrastructure, and community facilities.



NOTE 1. ALL SHIPS ARE TO REMAIN 4 NM OFF THE COAST, (EXCEPT WHILE TRANSITING DESIGNATED CHANNELS), UNTIL DIRECTED AND ARE TO ENTER ASSIGNED AREAS FROM SEA WITHOUT TRANSITING OTHER AREAS.
NOTE 2. DO NOT TRANSIT THIS AREA DUE TO HEAVY CONCENTRATION OF FISH TRAPS.
NOTE 3. CERRO MATIAS GUARDS CHANNEL 16 OF MARINE BAND DURING RANGE OPS FOR THE CONVENIENCE OF FISHERMEN.

Figure 3-2
Warning and Danger Areas for Surface Waters Surrounding the VNTR

Population. The population of Vieques has increased since 1990, when there were 8,602 residents on the island. The population grew to 9,106 in 2000. Most of the residents are concentrated in the two urban areas, Esperanza and Isabel Segunda, located in the central portion of the island. The population density for the municipality of Vieques is 179.2 persons per square mile (69.1 per km^2) based on the total land area of the island (United States Census Bureau [USCB] 2000). When the land area controlled by the Navy in 2000 (approximately 8,200 acres (3,318 ha) on the western end of the island and 14,500 acres [5,868 ha] on the eastern end of the island) are excluded from consideration, the population density on the civilian portions of Vieques in 2000 was approximately 593 persons per square mile (228.7 per km^2). This compares to a population density in Puerto Rico as a whole of approximately 1,112 persons per square mile (429.3 per km^2).

Housing. The total number of housing units located on Vieques was 4,388 in 2000. Of this amount, 3,319 units (75.6 percent) were occupied and 1,069 (24.4 percent) were vacant. Of the 3,319 units that were occupied, 2,659 were owner-occupied, and the other 660 were renter-occupied.

Economy, Employment, and Income. The Municipality of Vieques is a relatively low-income area within Puerto Rico. This low income is reflected in the lower median household income and the higher unemployment rate on the island. As of the 2000 Census, 60.6 percent of the families in Vieques were considered below poverty level, as compared to 44.6 percent in Puerto Rico as a whole. As shown in Table 3-2, the 1999 median household income on Vieques was $9,331, which is 35 percent lower than that for Puerto Rico as a whole and 40 percent to 45 percent lower than median household incomes in Ceiba, Fajardo, and Culebra. Of the Vieques households reporting earnings, 25.5 percent received some form of public assistance income (USCB 2000).

Table 3-2. Income Levels in 1999 for Vieques and Surrounding Municipalities

	Puerto Rico	*Ceiba*	*Culebra*	*Fajardo*	*Vieques*
Median Household Income	$14,412	$16,440	$17,008	$15,410	$9,331
Per Capita Income	$8,185	$9,256	$8,901	$7,852	$6,562

Source: USCB 2000

The economy of Vieques depends on the main island of Puerto Rico for various material resources and tourism patronage. Many factors have contributed to the slow rate of economic growth and development on Vieques, including the island's remoteness from the mainland of Puerto Rico.

According to the 2000 U.S. Census, the size of the civilian labor force on Vieques is 2,386 persons, which accounts for approximately 35.7 percent of the island's population 16 years and older. As well, in 2000 the census identified the unemployment rate on Vieques as being 28.2

percent as compared with 19.2 percent in Puerto Rico as a whole (USCB 2000). Table 3-3 provides a breakdown of employment by occupation for Vieques in 2000. As shown in the table, services are the largest occupational sector on the island and farming, fishing, and forestry the smallest.

Table 3-3. Number of Employed Civilian Persons 16 Years and Over by Occupation in 2000 on Vieques

Occupation	*Number of Workers*	*Percent Employed Workers*
Management, professional, and related	381	22.3
Service	479	28.0
Sales and office	281	16.4
Farming, fishing, and forestry	34	2.0
Construction, extraction, and maintenance	314	18.3
Production, transportation, and material moving	223	13.0
Total:	1,712	100

Source: USCB 2000

The Navy currently employs about 57 full-time and 9 part-time civilians at its facilities on Vieques. The breakdown of civilian employment by job type is shown in Table 3-4. In addition, there are approximately 43 military personnel whose primary duty assignment is Vieques and up to 400 additional military and civilian personnel temporarily assigned during periods when training exercises are in progress. The 43 military personnel assigned to Vieques include 5 range personnel, 15 Security Police, 6 EOD personnel, 7 military cooks, 1 military corpsman, and 9 Seabees. All military personnel assigned to Vieques are restricted to base when on the island, and have little direct effect on the local economy. The civilian personnel employed at the VNTR reside on Vieques, and the combination of payroll and the local purchase of supplies and other services is estimated to contribute approximately $2.0 million annually to the Vieques economy (US Navy 2002b).

Table 3-4. 2002 Navy Civilian Employment on Vieques

Function	*Type*	*Persons Employed*
AFWTF	Contract	27 full time/6 part time
Fire Department	Civil Service	10 full time
Public Works Dept.	Civil Service	5 full time
Public Works Dept.	Contract	9 full time/3 part time
Food Service	NAF*	6 full time
	Total:	57 full time/9 part time

*NAF=Non Appropriated Funds

Source: US Navy 2002b

In addition to the personnel employed on Vieques, there are 2 civilian contract employees on the nearby island of Culebra who serve as sound focus monitors, 4 civilian contractors who work at AFWTF Headquarters on NSRR, and 5 military personnel who reside at NSRR but who work

full time on Vieques during exercises. All of these jobs are tied directly to the continued operation and use of the VNTR by the Navy.

Tourism. The tourism season on Vieques runs from November through April and in the summer from June through August. Vieques receives approximately 4,000 visitors annually and has approximately 150 available hotel rooms (Government of Puerto Rico, 1999). The total number of hotel rooms on the island could increase to approximately 300 if the recently completed Martineau Bay Resort near the airport opens for business. It is estimated that the direct revenue generated by tourism in Vieques, in 1995 dollars, is approximately $1.8 million annually (US Navy 2000). This estimate does not include the indirect revenue generated by tourists that also benefits Vieques. Tourist dollars spent on the island in the retail and other sectors are recycled back into the local economy. Retail establishments purchase supplies and raw materials from local merchants and hire additional employees following the initial tourist expenditure. In turn, these local merchants also purchase additional goods and services from the local economy, further expanding positive economic benefits of the initial injection of funds. Consequently, tourism has a multiplier or ripple effect on the Vieques economy. However, the multiplier effect is lessened somewhat because Vieques depends heavily on imports from off-shore suppliers.

Agriculture. Soil conditions and limited rainfall have constrained agricultural development on Vieques. Cattle grazing with some limited cultivation of crops dominate agriculture on the island. These crops include coffee, plantains, bananas, root crops, various fruits, and grasses for grazing.

In 1998, the market value of agricultural products sold by farms on Vieques totaled $1,040,000, which is more than two and one-half times the value of goods sold in 1992 (i.e., $393,000). Between 1992 and 1998, the number of farms on Vieques increased from 51 to 56, while the total number of acres under production fell by one-third, from 6,624 to 4,420 (2,650 to 1,768 ha). Two-thirds of the land devoted to agriculture, 2,948 acres (1,179 ha), is used for pasture or grazing (USDA 1998).

Farming is neither the principal occupation nor principal source of income for most farm operators on the island. In 1998, more than two-thirds of the operators were engaged in non-agricultural activities as their principal occupation, while 79 percent earned less than 25 percent of their total income from farming-related activities (USDA 1998).

Fishing. Fishing is another economic activity on Vieques. According to the Puerto Rico Department of Natural and Environmental Resources (DNER), from 1987 to 1997, approximately one million pounds (453,590 kilograms [kg]) of fish, valued at $1.8 million, were caught off Vieques Island. Annually, this averages 95,000 pounds (43,091 kg) worth $168,000. Based on this annual average, Vieques accounts for approximately 8 percent of the total market value of fish and other aquaculture products ($2,078,532 in 1998) sold in Puerto Rico (USDA 1998). Lobster and conch are the main shellfish captured, while yellowtail snapper, red hind, butterfish, lane snapper, hogfish, mutton snapper, white grunt, grouper, and parrotfish follow close behind (Government of Puerto Rico, 1999). The most productive fishing areas are located off the northeastern and southeastern coastlines of Vieques and include waters surrounding the

LIA. Because piers are limited, most fishing takes place from small boats in the bays, such as Puerto Ferro and Puerto Mosquito (USDA 1998).

It has been estimated that the fish caught in and around Vieques' coral reefs support 300 fishing families (Government of Puerto Rico, 1999), although the 2000 census data show only 34 individuals employed in fishing, farming, or forestry occupations (USCB 2000). The available data regarding fisheries landings, value, and participation also support the view that fishing is mostly for local consumption, subsistence, and recreation (US Navy 1996).

Taxes and Revenue. The Municipality of Vieques generates revenues from taxes collected on real property (land and improvements), personal property, business establishments, intergovernmental transfers, and the municipality's share of motor vehicle, lottery, cigarette, and miscellaneous taxes. Vieques also receives a special subsidy from the Commonwealth. Historically, the Navy owned more than two-thirds of the lands on Vieques. Prior to the land transfer of the former Naval Ammunition Support Detachment in 2001, the Navy owned 8,200 acres (3,280 ha) on the western end of the island in addition to the 14,500 acres (5,868 ha) on the eastern end of Vieques, out of the estimated total of 33,088 acres (13,235 ha) of land on the island. Because of this land ownership pattern, only a small proportion of land has traditionally been assessed for property tax purposes. In 2001, approximately 8,100 acres (3,240 ha) of former Navy property was transferred to the Municipality of Vieques, the DOI, and the Puerto Rico Conservation Trust. Prior to the transfer, approximately 7,865 acres (3,146 ha) were taxable by the local government. The property transfer is estimated to have added approximately 800 acres (320 ha) to the tax base, for a total of 8,665 acres (3,366 ha) (US Navy 2000). However, approximately 2,000 of these acres (800 ha) are considered to be tax-exempt lands for other non-military reasons, leaving a property tax base that is derived from assessing 6,665 acres (2,666 ha).

Transportation. There are two options for traveling to and from Vieques from the main island of Puerto Rico. One alternative is the passenger ferry service that runs between Fajardo on the main island of Puerto Rico and Isabel Segunda on Vieques. The other is regularly scheduled commercial air service from Fajardo or from San Juan's Isla Grande airport to the Antonio Rivera Airport located west of Isabel Segunda. Following a transfer of land from the Navy to the Puerto Rico Ports Authority, the Ports Authority recently expanded the runway at Antonio Rivera Airport by 900 feet (274 m) in order to allow larger aircraft to land on Vieques (Government of Puerto Rico, 1999).

Potable Water Supply and Distribution. Potable water on Vieques is supplied from the Puerto Rico mainland and is transported to the island from Naguabo on the eastern coast of Puerto Rico through a 12-inch (31-centimeter) submarine pipe owned by the Puerto Rico Aqueduct and Sewerage Authority (US Navy 1996). Potable water is then piped to various locations on the island. The VNTR is supplied water by a 4-inch (10-centimeter) pipe, filling a 120,000-gallon (454,200-liter) steel water storage tank located at the Camp Garcia compound (US Navy 2002c). From its supply at Camp Garcia, the Navy trucks water to fill a storage tank at OP-1 as needed.

Wastewater Treatment. The Navy operates septic tanks at Camp Garcia and OP-1, as well as a temporary sewage holding lagoon at Camp Garcia. There is a wastewater treatment facility that processes wastewater in urban Isabel Segunda. Septic tanks are used in rural parts of the island and in Esperanza.

Power. The Puerto Rico Electric Power Authority (PREPA) provides the power supply to Vieques. Camp Garcia is served by PREPA power lines, and has a peak demand of about 125 kilovolts-ampere (US Navy 2002c). Power for OP-1 and other remote facilities is supplied by individual power generators. OP-1 maintains both base load and emergency generators on site at Cerro Matias. In addition, Camp Garcia maintains emergency power generators for use during interruptions of the commercial power supply.

Sanitary Landfill Facilities. Solid waste generated from the VNTR goes to the municipal landfill near Santa Maria (US Navy 1996). The site occupies approximately 10 acres (4 ha) and is permitted jointly by the EPA and Puerto Rico Environmental Quality Board (EQB).

Communications. Communications systems are rudimentary on Vieques, and a substantial tax is placed on telephone calls to the main island of Puerto Rico. Most communications within the VNTR and between the VNTR and other locations outside of the VNTR are handled through dedicated Navy-owned communications systems (microwave and radio) or by commercial cell-phones.

Community Services and Facilities. Vieques has various community facilities that serve its residents. Vieques and Culebra are part of an integrated school system that operates 15 schools. Twelve of these schools, including the high school, are located on Vieques. There is one municipal hospital located on Vieques that is limited in the amount and type of medical services that can be provided. Fire and police protection are part of the larger Commonwealth service forces. Although the municipality's jurisdiction is limited to the civilian area, there has historically been effective cooperation between the Navy and local law enforcement as well as fire protection agencies.

3.3 NOISE

Sound levels in the civilian portions of Vieques are similar to those found on other Caribbean islands with a day-night sound level (DNL) of approximately 60 decibels (dB) (US Navy 2001a, p. 3-31). DNL is defined as the energy-averaged sound level obtained for a given day, over a 24-hour period. The Puerto Rico EQB 1987 Noise Regulations specify a continuous DNL of 60 dB (average) during the daytime hours and an average of 50 dB in residential areas during the nighttime hours. Naval activities on VNTR have occurred within this range of DNL.

The LIA is located at the eastern end of the VNTR approximately 10 miles from the nearest populated area on Vieques. To ensure that noise levels generated at the LIA are closely monitored, a remote noise monitoring station has been established at the Camp Garcia gate. In addition, noise is monitored by six Vieques citizens as part-time listeners near Lujan/Destino, Monte Santa, Esperanza, and Isabel Segunda.

3.4 AIR QUALITY

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The significance of the pollutant concentration is determined by comparing it to the federal and state or commonwealth air quality standards. The Clean Air Act (CAA) and its subsequent amendments established the National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter less than 10 microns in diameter, and lead. These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. Puerto Rico has adopted the NAAQS. Based on ambient criteria pollutant data, US EPA designates all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS.

Puerto Rico (including Vieques) is encompassed by a single air quality control region (AQCR). Therefore, the ROI for this resource includes the AQCR in which the island of Vieques and the VNTR are located. Based on ambient monitoring data, collected mainly in the San Juan vicinity by the Puerto Rico EQB, EPA classifies the AQCR as in attainment, or in other words air pollutant concentrations on Vieques are below NAAQS for all six criteria pollutants. In 2000, the Navy completed a Title V permit determination for its facilities at the VNTR and the results indicated that the facilities are not a Title V major pollutant source (US Navy 2000b). The VNTR currently is operating under a minor source operating permit issued by the Puerto Rico EQB.

3.5 HYDROLOGY AND WATER QUALITY

For purposes of this EA, hydrology and water quality together comprise the category of water resources. The hydrology of a given area is influenced by topographical, geological, and soil features such as drainage patterns, rock formations, and soil types. These features also contribute to the transport of organic and inorganic material and play a significant role in determining the water quality of a given area. Surface and subsurface (groundwater) quality is also influenced by land use activities, both past and present.

Surface Water. Because of its topography, Vieques has many small watersheds, most of which are less than a square mile in drainage area and have no well-defined channel. The higher elevations generally follow along the east-west axis of the island. From the high points, small, normally dry, intermittent drainage conveyances (ravines), called *quebradas*, flow either north or south from the mountains toward the sea. During the rainy season, these drainages can accommodate relative high flows. In the dry season, these drainages pond or dry up, although groundwater may sustain some isolated springs. Rainfall on Vieques ranges from 25 to 45 inches (64 to 114 centimeters) annually. A large percentage of this rainfall evaporates, resulting in only approximately 5 percent of rainfall recharging underlying aquifers and an additional 5 percent comprising runoff. No permanent freshwater lakes or streams exist on Vieques and the streams are classified as "ephemeral," flowing for only a few days after a major rainfall event (US Navy 1996, p. 3-90).

Open surface waters on VNTR are restricted to coastal lagoons. These are estuarine, typically with direct connections to the sea that allow for tidal exchange of water. However, storms and hurricanes can deposit sand across the outlets of these lagoons, restricting tidal exchange. Because of high evaporation rates experienced on Vieques, loss of this connection can reduce the open water size, resulting in the development of extensive salt flats. The Federal Emergency Management Agency has not mapped floodplains for Vieques, therefore, it is classified as a flood hazard Zone D—undetermined flood hazard.

The coastal waters of Vieques are subject to and classified in accordance with Puerto Rico Water Quality Standards. For the most part, the island's marine waters are of acceptable quality and are classified as suitable for human contact and use in the propagation and preservation of desirable marine species.

Groundwater. The groundwater aquifers on Vieques are the *Resolución* Valley Aquifer (located in the western region) and the *Esperanza* Valley Aquifer (located in the central region). Rainfall is the primary source of recharge to these aquifers and before installation of a potable water line from the mainland of Puerto Rico, the *Esperanza* Valley Aquifer supplied most of the potable water. The well fields associated with both these aquifers are currently being used only as backups in the event the main water supply is disrupted.

In general, these aquifers are formed from sedimentary deposits including sand, silt, and clay situated atop volcanic rock. The thickness of the sedimentary deposits in the Esperanza valley ranges from 0 to 90 feet below ground surface. Recharge to the aquifer occurs primarily along the central volcanic contact. The average elevation on Vieques is 200 feet above sea level. Because the island's highest elevations are generally along the east-west axis, groundwater from within the aquifers typically flows to the northern and southern boundaries of the island toward the sea.

3.6 TERRESTRIAL ENVIRONMENT

Terrestrial resources are found on the land mass comprising Vieques. These resources include vegetation, Conservation Zones, and wildlife. For purposes of this analysis, the ROI for the terrestrial environment includes the lands encompassed within the VNTR that would be potentially affected by amphibious landings and other Navy and Marine training exercises. Refer to Figure 3-1, Land Use, for an illustration of these terrestrial resources.

Vegetation. Prior to Navy possession of the eastern portion of Vieques, the land was cleared for agricultural (sugar cane production and grazing) purposes (US Navy 1996, p 1-3). In the late 1940s, following Navy acquisition, almost all agricultural activity on the property ceased with the exception of a grazing lease in the western portion of VNTR. This historic agricultural use resulted in dense shrub thickets and secondary forest growth development. This growth consists of native and exotic species with most lands on Vieques resembling the dry coastal zone vegetation found on mainland Puerto Rico. The original subtropical moist coastal forest is found only in remnant pockets in higher elevations (US Navy 2000, p 3-20).

Twelve distinct community types have been delineated and described on VNTR lands. They include bare ground disturbed by human activities, open sandy beach and adjacent beach vegetation in salt spray zone, shallow salt/sand flat, open-water lagoon, mangrove communities, evergreen scrub of drought-resistant shrubs on rocky coasts and limestone formations, mixed woodland of deciduous formations on inner hills and slopes, forest scrub along drainages in mangrove forests, forested, sparse thorn scrub, thick thorn scrub, and grassland that is slowly changing back to thorn scrub. All twelve are found in the VNTR (US Navy 2001b, p 5-3).

Conservation Zones. Conservation Zones are established on the VNTR (refer to Figure 3-1) in accordance with the 1983 MOU between the Commonwealth of Puerto Rico and the Navy. Four Class I Conservation Zones were established as part of the 1983 MOU and 5 Class II Conservation Zones were established as part of the Navy's Land Use Management Plan (a description of each is provided in Section 3.1). Under current Navy operational guidelines, Class I areas may not be used for purposes other than conservation, are protected from damaging activities, and are managed to protect and maintain their natural value. Class II areas are managed to protect various environmentally sensitive, but not critical, habitats and natural areas. Military and civilian uses are permitted in these Class II areas with certain restrictions.

Wildlife. Because of its island ecosystem, abundance or diversity of terrestrial vertebrates is not found on Vieques (US Navy 2001b, p 5-6). The ocean barrier impedes natural dispersion. There are 25 orders of insects, represented by 5,066 species. Most of them can be grouped into six orders: Hymenoptera (bees, ants, and wasps), Lepidoptera (butterflies and moths), Diptera (flies, midges, and mosquitoes), Coleoptera (beetles and fireflies), Heteroptera (plant bugs and stink bugs), and Homoptera (cicadas and leafhoppers).

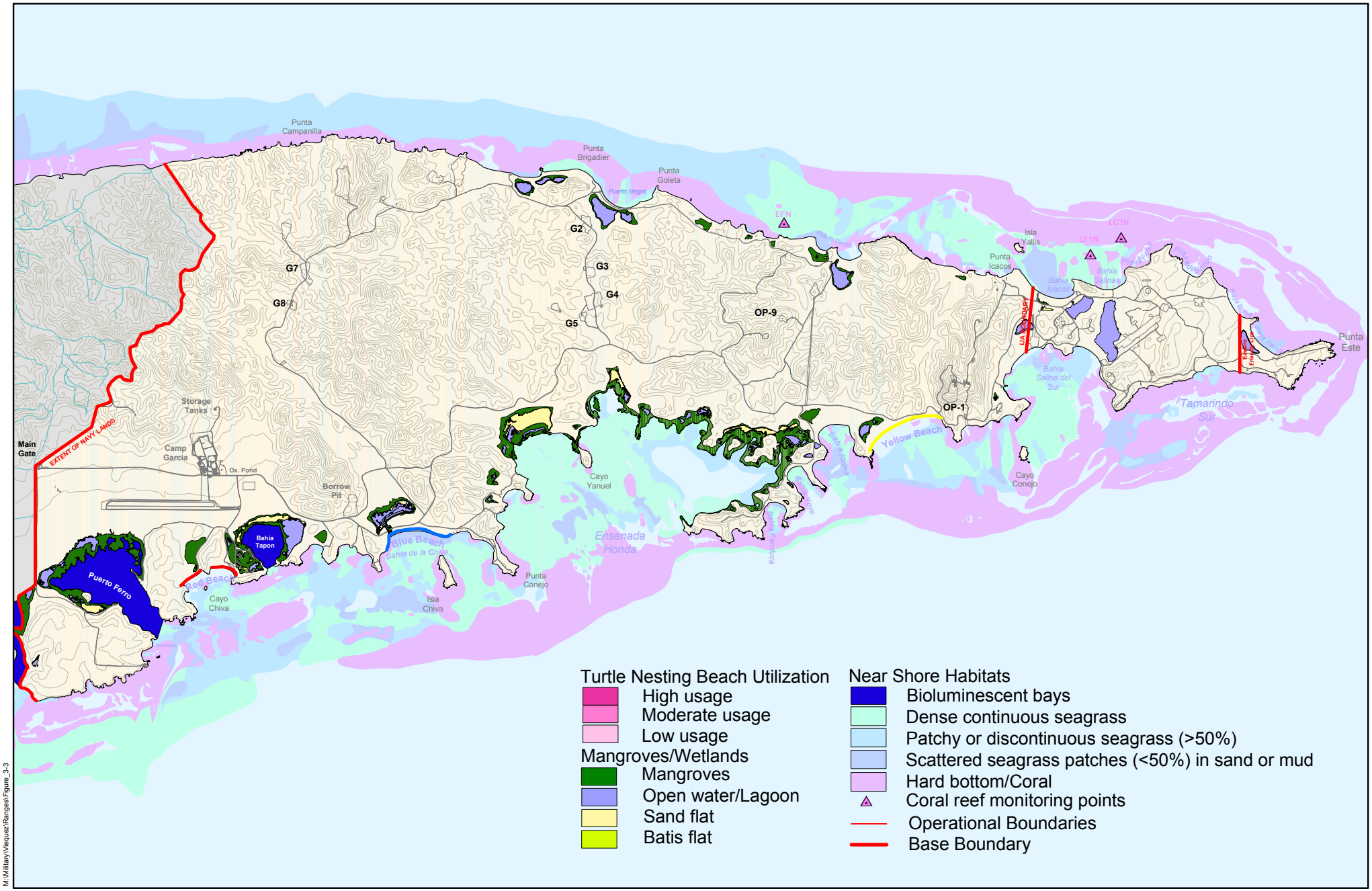
Eight species of crustaceans and 6 species of mollusks are known to occur in the nearshore coastal habitat of Vieques (US Navy 1996, p. 2-28). At least 22 amphibious and reptilian species have been reported on Vieques: 3 frog types, the marine toad, 11 lizards and geckos, the worm snake, the ground snake, one freshwater turtle, and 4 sea turtles (US Navy 2001b, p 5-6).

Approximately 120 species of land birds have been reported on the island: 39 species of lagoon birds, and 13 species of seabirds. While some breed on Vieques, others are non-breeding residents, winter migrants, or accidental strays (US Navy 2001b, p. 5-6 and 5-7).

Bats are the largest group of mammals on Vieques and one species, the red fruit bat, is reported to be the only surviving endemic mammal on the island. All other mammals, including house mice, rats, mongooses, domestic animals, wild horses, and feral cats and dogs, have been introduced by humans (US Navy 2001b, p. 5-6).

3.7 MARINE ENVIRONMENT

Marine resources are found in the waters surrounding Vieques. These resources include coral reefs, fish communities, mangrove forests, and seagrass beds. For purposes of this analysis, the ROI for the marine environment includes the region immediately adjacent to the VNTR shoreline that is potentially affected by amphibious landings and other training exercises such as ordnance delivery and aircraft overflights. Figure 3-3 illustrates these unique marine resources.



M:\Military\Vieques\Ranges\Figure_3-3

1 0.5 0 1 Kilometers

1 0 1 Miles

Figure 3-3
Unique Communities

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Coral Reefs. The most common coral reefs, mostly found on hard promontories, in the eastern portion of Vieques Island include fringing, patch, and bank/barrier reefs. Descriptions of each type, as well as lists of associated coral species, can be found in the *Programmatic Environmental Assessment of Continued Use of the Atlantic Fleet Weapons Training Facility Inner Range* (US Navy 2001b, p.5-6). The most common species include elkhorn (*Acropora palmate*), fire coral (*Millepora* spp.), cavernous star coral (*Montastrea annularis*), and brain coral (*Diploria* spp.).

The Navy has evaluated the impacts of its training on the health of coral reefs in the waters surrounding the VNTR, as discussed in *Reef Damage Assessment & Condition Survey* (US Navy 1999a), *Biological Assessment for Continued Training Activities* (US Navy 2001b), *Supplement to Programmatic Environmental Assessment of Continued Use of the Atlantic Fleet Weapons Training Facility Inner Range* (US Navy 2002a) and *Ex-USS Killen Site Investigation and Biological Characterization, Vieques Island, Naval Station Roosevelt Roads, Puerto Rico* (US Navy 2002e). The overall condition of the adjacent coral reefs are generally good but are largely influenced by natural disturbances, such as recurrent tropical storms (e.g., hurricanes David in 1979 and Hugo in 1989), coral diseases, and mass coral bleaching. Some very shallow areas of reef exhibit low diversity, low live cover, and few coral taxa primarily because of exposure at low tide and high temperatures (US Navy 2001b, p 5-8). During training in 2000, approximately 16 percent of NSFS rounds fired at the LIA skipped and landed in the water (US Navy 2001a, p. 3-26). Based on previous studies (US Navy 1999a, p. 53) it is estimated that less than 50 percent of those skips may have landed on a coral reef and that the velocity of the inert munition would have dissipated prior to coming to rest on the reef (US Navy 2001a, p. 3-26). Therefore, current Navy training activities have little influence on the coral reefs in the vicinity of the VNTR and are consistent with the goals of Executive Order (EO) 13089 (Coral Reef Protection), dated June 11, 1998 (US Navy 2001a, p. 4-10).

Mangroves. Mangrove forests are wetlands found along the coastal lagoons and/or on the low-lying areas of the island. The mangrove forest of tropical and subtropical coastlines is an association of trees, shrubs, and other plants that are adapted to growing in brackish to saline tidal waters. This wetland type provides habitat for terrestrial, semi-terrestrial, and aquatic plants and animals. On Vieques, mangroves provide habitat for animals such as lobsters, oysters, crabs, snails, fish, and various birds. These saltwater swamps are dominated by moderate to dense growth of evergreen shrubs and four mangrove species: black, white, red, and button mangroves. The Navy recently conducted a study of mangroves on Navy lands, *Mangrove Forest Health and Status, Vieques Island: Draft Report March 2002*(US Navy, 2002f). According to this recent evaluation, there are about 500 acres of fringe and basin mangrove forests on Navy lands on Vieques (US Navy, 2002f, p. 3). Mangrove resources have been affected by past activities such as livestock grazing and soil erosion from road construction and maintenance, ordnance delivery and disposal, as well as past training activities. However, in the past 20 years, various efforts have been made to protect and enhance Navy mangrove forests, including designation of Conservation Zones and development of a forest manual. Nearly all of the basin mangrove communities on the VNTR displayed indicators of good health and appear to have maintained the same amount of coverage since the mid-1960s (US Navy 2002f, p. 3). Damage to fringe

mangroves has occurred from periodic destruction caused by severe storms (e.g., hurricanes Hugo and Opal), resulting in tidal creek and channel entrance blockage and defoliation and uprooting of trees (US Navy 2000, p. 3-31).

Seagrass Beds. The entire island of Vieques is almost completely surrounded by seagrass beds, altogether accounting for 59 percent of the total nearshore benthic habitat. These seagrass beds occur in the small bays and lagoons adjacent to VNTR. The three dominant species of seagrasses, in order of their relative abundance, are turtle grass, manatee grass, and dwarf seagrass. Seagrasses are the main food for many species, including federally endangered manatees and sea turtles (US Navy 2001b, p. 6-24).

3.8 ESSENTIAL FISH HABITAT

A high diversity of fish inhabits the coastal waters of Puerto Rico, including open water or pelagic fish, reef fish, and other fish that inhabit grassbeds and sandflats. At least 131 species of reef fish have been seen at Vieques, including damselfish, parrot fish, wrasses, and surgeonfish. From 1979 through 1990, reef fisheries decreased, causing many rippling effects throughout the coral system. Large fish predators and parrot fish were absent from the reefs, causing a proliferation of damselfish. Damselfish harm coral by algae farming on coral substrate. Over-fishing of spiny lobster (*Panulirus argus*) caused coral-eating mollusk, their favorite food, to increase and impact elkhorn corals (US Navy 2001b, p 5-8).

Most fishing in Vieques waters is for subsistence purposes and is conducted by individuals or families. However, there are fishermen associations on the island that catch and sell fish for local consumption. Spiny lobster and conch, as well as snapper and grouper are sought by these fishermen. Recreational fishing also occurs in coastal waters adjacent to VNTR. The Puerto Rico Department of Natural and Environmental Resources (DNER) is responsible for managing the fisheries in the coastal waters of Vieques under Commonwealth Law No. 278 and associated fisheries regulations and Administrative Orders.

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 requires that federal agencies proposing to authorize, fund, or undertake actions that may adversely affect Essential Fish Habitat (EFH) first consult with the National Marine Fisheries Service (NMFS). The Act defines EFH as the waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. In 1998, the Caribbean Fishery Management Council designated EFH in the Caribbean area for 17 species covered by three fishery management plans (Reef Fish, Spiny Lobster, and Queen Conch), and for various coral species and coral reef communities by the Coral Fishery Management Plan. The Caribbean Fishery Management Council defined EFH as everywhere that these species occur. This encompasses all waters and substrates around Vieques (including the VNTR), its coral reefs, seagrasses, and mangrove wetlands (US Navy 2001a, p. 3-27). As described in previous documentation regarding current and continued use of the VNTR for training, the Navy has consulted with the NMFS for individual training exercises conducted on the VNTR, and NMFS has concurred that, based on a number of actions the Navy is taking to limit impacts on EFH, such as deactivating 3 near shore targets in the LIA, impacts to EFH have been minimized (US Navy 2002a, p. 17). Therefore, Navy training operations at VNTR are

conducted in a manner that satisfies the requirements in the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act.

3.9 THREATENED AND ENDANGERED SPECIES

There are several species of terrestrial and marine wildlife and plants that are protected by federal law. Endangered species are those species in danger of extinction throughout all or a significant portion of their range. Threatened species are those species that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range. As directed by the Endangered Species Act (ESA), federal agencies must ensure that their actions are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The ESA also prohibits all persons subject to U.S. jurisdiction from "taking" endangered or threatened species, which includes harm or harassment of a protected species within the U.S., its territories and commonwealths, or on the high seas.

Table 3-5 presents a list of wildlife and plant species that are protected and that could potentially occur at the VNTR (US Navy 2001b).

Table 3-5. Federally Listed Plants and Animals on Vieques Island, Puerto Rico

Species	*Federal Status*
Plants	
Cobana negra (*Stahlia monsperma*)	Threatened
Thomas' lidflower (*Calyptranthes thomasiana*)	Endangered
Chamaecrista glandulosa var. *mirabilis*	Endangered
Beautiful goetzea (*Goetzea elegans*)	Endangered
Eugenia woodburyana	Endangered
Reptiles	
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Green sea turtle (*Chelonia mydas*)	Threatened
Loggerhead sea turtle (*Caretta caretta*)	Threatened
Kemp's ridley sea turtle *(Lepidochelys kempii)*	Endangered
Olive ridley sea turtle *(Lepidochelys olivacea)*	Threatened
Birds	
Brown Pelican (*Pelecanus occidentalis*)	Endangered
Roseate tern (*Sterna dougallii*)	Threatened
Mammals	
West Indian manatee (*Trichechus manatus*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Blue whale (*Balaenoptera musculus)*	Endangered

Source: US Navy 2001b, p. 6-1 and 6-2

Cobana negra is a medium-sized evergreen tree that was listed as threatened in 1990. They grow in brackish, seasonally flooded wetlands with mangrove and buttonwood trees. Nearly all of the known cobana negra are growing at the edge of salt flats or shallow lagoons inundated during the wet season. There are three known populations of this tree on Vieques, totaling about 48 individuals. Only one population is located in the VNTR, totaling 20 individuals (US Navy 2001b, p 6-2 through 6-8).

Thomas' lidflower was listed as an endangered species in 1994. On Vieques, it only occurs on Monte Pirata (not part of the VNTR). *Chamaecrista glandulosa* var. *mirabilis* was listed as endangered in 1990 and is extremely rare within its range. A specimen was collected in 1992 but has not been found since. *Eugenia woodburyana* was listed as endangered in 1994 and has been included in the Center for Plant Conservation's Report on Rare Plants in Puerto Rico, and may become extinct within the next 10 years. It only occurs on Monte Pirata (US Navy 2001b, p 6-4). Beautiful goetzea was listed as endangered in 1985. It does not occur on the VNTR but in western Vieques.

The brown pelican was listed as endangered in 1970 because of interference and disturbance of nesting colonies by humans. Cayo Conejo (a Class I Conservation Zone) is the only active reproductive location on Vieques and supports over 50 percent of the Puerto Rico nesting population. The brown pelicans fish in quiet waters and occur usually in shallow estuarine water or coastal areas (US Navy 2001b, p. 6-7). The roseate tern is federally listed as threatened, and its presence is not well-documented within VNTR, however, a few have been observed in flight and a nest was identified in July 2001 on Punte Este.

Sperm whales are the third most common odontocete in the Puerto Rico area. They inhabit offshore water, and are only found close to land where there is a sharp drop in the bottom depth of the ocean. This situation causes upwelling, resulting in a high concentration of prey. In Vieques, the whales are present from late fall, throughout the winter, and into early spring and a pair was observed in November 2000 off the southeastern tip of Vieques (US Navy 2001b, p. 6-16).

Humpback whales migrate to the Vieques area in winter, peaking between February and March and have been observed in the waters north and south of the VNTR (US Navy 2001b, p.6-16). Fin whales are seen less frequently in this region than humpback, but migrate to warmer waters in the winter to mate and calve. Sei whales are more tropical, and are found inshore as well as offshore. The majority of sei whale sightings are in winter and early spring (US Navy 2001b, p 6-22). For the blue whale, the only Caribbean record of this species was in the vicinity of San Cristobal (northern entrance to the Panama Canal) in 1922.

Manatees are concentrated at the northwest end of Vieques, west of Desembarcadero Mosquito where extensive seagrass beds attract them. The rarity of manatee sightings around the LIA can be attributed to the fact that there are no sources of fresh water in the VNTR at the eastern end of Vieques other than limited runoff from rainfall events.

Four species of sea turtles are known to occur on Vieques (hawksbill, leatherback, green, and loggerhead). Hawksbill, green, and leatherbacks turtles nest regularly on Vieques, including the LIA (see Figure 3-3 for turtle nesting beach utilization). Hawksbills prefer the Bahia Jalova and Green Beach, but have used Tamarindo Sur and Tortuga Beach. Leatherbacks primarily use Yellow Beach, and sporadically nest at Red, Blue, and Tortuga Beaches. Green sea turtles have also been observed at Tortuga Beach. Loggerheads have not been documented nesting on Vieques and sightings are uncommon (US Navy 2001b, p. 6-13 through 6-15). The Kemp's ridley sea turtles have not been observed on Vieques and are only rarely observed elsewhere in the Caribbean.

3.10 CULTURAL RESOURCES

Section 110(a)(2) of the National Historic Preservation Act (NHPA, 16 U.S.C. 470, as amended) requires federal agencies to inventory, protect, and maintain historic properties under their jurisdiction. Section 110(d) of this act requires federal agencies to integrate the mandated measures for historic preservation into their plans and programs.

Under Section 106 of NHPA, federal agencies are obligated to take into account the effect of their undertakings on cultural resources eligible to the National Register of Historic Places (NRHP) and to provide the Advisory Council on Historic Preservation an opportunity to comment on these undertakings. In response to these statutes, the Navy has conducted extensive cultural resource surveys of Navy-owned lands on Vieques from 1978 through the present and has a Cultural Resources Management Plan (US Navy 1986) in place to properly manage these resources.

Architectural Resources. Architectural resources may include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Architectural resources must generally be more than 50 years old to be considered for protection under existing cultural resource laws. However, more recent structures, such as Cold War-era military buildings, may warrant protection if they have the potential to be historically significant. Hacienda Puerto Ferro Historic Site and Puerto Ferro Lighthouse and Cisterns, located south of Camp Garcia near the southwest boundary of the VNTR, were determined eligible to the NRHP.

Archaeological Resources. These resources are locations where human activity measurably altered the earth or left deposits of physical remains (e.g., tools, arrowheads, or bottles). "Prehistoric" refers to resources that predate the advent of written records in a region. These resources can range from a scatter composed of a few artifacts to village sites and rock art. "Historic" refers to resources that postdate the advent of written records in a region. Archaeological resources can include campsites, roads, fences, trails, dumps, battlegrounds, mines, and a variety of other features.

Investigations on Vieques over the last 60 years have yielded evidence of settlement during the Archaic and Ceramic Ages, the Spanish Colonial period, as well as during the historic period of the twentieth century. The Navy has performed and continues to perform surveys to identify cultural sites on VNTR in accordance with Section 110 of the NHPA. To date a total of 134 archaeological sites have been identified on Navy lands on Vieques, including middens,

campsites, isolates, and scatters. Of the sites identified, 11 are listed on the NRHP, 12 have been determined eligible for listing, 22 have been determined not eligible, and 89 resources have not been evaluated. As part of a multi year plan, the Navy has continued to survey to identify additional sites, as well as assess the eligibility of unevaluated sites (U.S. Navy 2002g and R. Christopher Goodwin & Associates 2001)

3.11 ENVIRONMENTAL CONTAMINATION

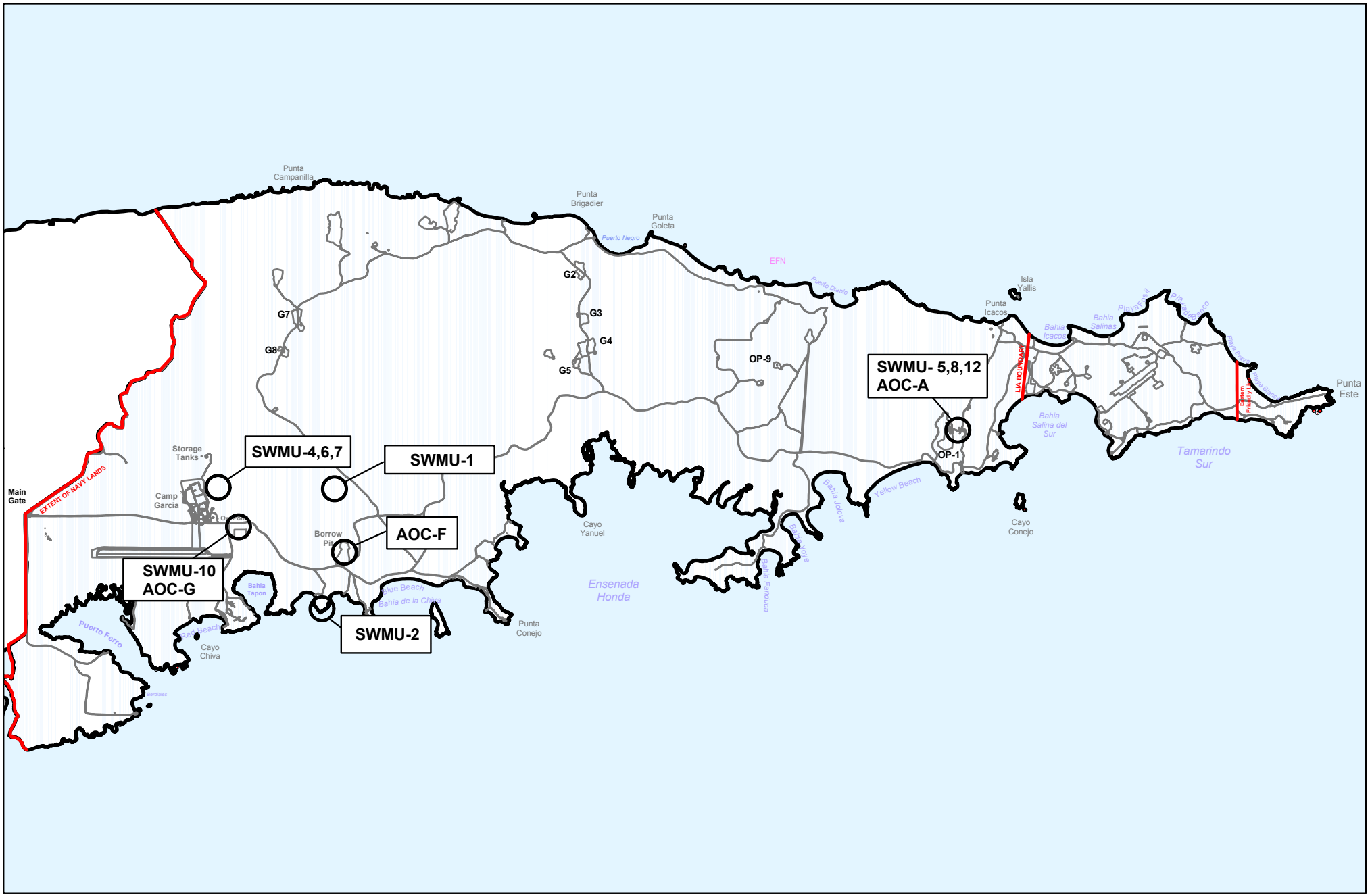
The Navy has been resident at the VNTR since the late 1940s. Exercises from air, sea, and land have taken place since that time. In order to identify and characterize the level and extent of contamination present several investigations have been undertaken and include:

- Initial Assessment Study (1984)
- RCRA Facility Assessment (EPA 1988)
- U.S. Geological Survey, Reconnaissance of the Groundwater Resources of Vieques Island (1989) and Identification of Water Wells on Vieques (1995)
- Updated RCRA Facility Assessment (1995)
- Hydrogeologic Investigation (1999)
- Aerial Photographic Analysis of AFWTF, SWMUs 01 and 10 and AOCs F and G (1999)
- EPA Region II Groundwater Sampling Reports (1999 and 2000)
- Aerial Photographic Analysis of EMA/AFWTF (2000)
- Personal interviews and Navy records search (2000)
- Agency for Toxic Substances and Disease Registry (ATSDR) Focused Public Health Assessment, Drinking Water Supplies and Groundwater Pathway Evaluation (2001)
- Ex-Killen Site Investigation and Biological Characterization, Vieques Island (2002)

In 2001, the Navy prepared *Description of Current Conditions Report, Atlantic Fleet Weapons Training Facility, Vieques Island, Puerto Rico* (US Navy 2001c) that describes the current conditions of the contaminated sites identified in previous investigations. The Current Conditions Report is being conducted as part of an overall Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) currently being prepared by the Navy in accordance with the Administrative Order of Consent (EPA 2000). The purpose of the RFI is to determine the nature and extent of potential releases of hazardous wastes, solid wastes, and/or hazardous constituents at or from the VNTR.

Twelve solid waste management units (SWMUs) and three areas of concern (AOCs) were identified. Of these 12 designations, 9 SWMUs and 3 AOCs were included in the EPA Consent Order and are listed below and their locations are shown in Figure 3-4:

- SWMU 01—Camp Garcia Landfill (east of Camp Garcia)
- SWMU 02—Fuels Off-Loading Site (Camp Garcia)
- SWMU 04—Waste Areas of Building 303 (Camp Garcia)
- SWMU 05—Spent Battery Accumulation Area (OP-1)
- SWMU 06—Waste Oil and Paint Accumulation Area (Seabees Area, Camp Garcia)
- SWMU 07—Waste Oil Accumulation Area (outside Building 303, Camp Garcia)
- SWMU 08—Waste Oil Accumulation (OP-1)



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1 0.5 0 1 Kilometers

0.6 0 0.6 Miles

Figure 3-4
Solid Waste Management Units and Areas of Concern

N W E S

- SWMU 10—Sewage Treatment Lagoons (Camp Garcia
- SWMU 12—Solid Waste Collection Unit Area (OP-1)
- AOC-A—Diesel Fuel Fill Pipe Area (OP-1)
- AOC-F—Rock Quarry (Camp Garcia)
- AOC-G—Pump Station and Chlorinating Building at Sewage Lagoons (Camp Garcia)

The remaining three SWMUs are located in the LIA and were excluded from any corrective action requirements at this time under the terms and conditions of the EPA Consent Order (EPA 2000) because the LIA is maintained as an active range.

Groundwater investigations have revealed generally high concentrations of sodium and chloride ions. Hydrogeologic investigational data indicate that groundwater flow is primarily to the north and south of the island. Therefore, groundwater flow within the bedrock is not likely to travel from Navy property offsite to the west. Groundwater in the alluvial deposits flows primarily to the east, and also is unlikely to flow from Navy property offsite to the west, to neighboring communities. No explosive compounds were detected in either the soil or groundwater samples collected (US Navy 1999b, p. 6-1). As a result, no chemicals of potential concern and no human health or ecological risk exist that were identified with regard to explosives.

A review of aerial photographs since 1959 has identified 23 additional potential sites throughout the VNTR where environmental remediation may be required. These sites were identified if there was any evidence of buildings, materials, debris, or ground disturbance present. These potential sites will be investigated by the Navy as part of the RFI currently being conducted. In addition to these investigations, an Environmental Baseline Survey (EBS) currently is being conducted on the VNTR and is scheduled for completion by Spring 2003. This investigation will identify and characterize any known and existing contamination sites by using historic records, interviews, aerials photography, and on-site visits.

In conjunction with the EBS effort, the Navy is also conducting an unexploded ordnance (UXO) archival search of ordnance use on the VNTR to characterize training at VNTR, how the range at VNTR was used, what types of ordnance were deployed, where and when ordnance was deployed, and where the ordnance went. While the archival research may not identify the exact positions of all UXO it should provide the Navy with a good understanding of the historical use of the VNTR and a high probability of where UXO may be located. This work is also scheduled for completion by Spring 2003.

3.12 ENVIRONMENTAL JUSTICE/PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS

In 1994, Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (Environmental Justice), was issued to focus the attention of federal agencies on human health and environmental conditions in minority and low-income communities. The environmental justice analysis focuses on the distribution of race and poverty status in areas potentially affected by implementation of the proposed action.

In 1997, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (Protection of Children), was issued to ensure the protection of children. Socioeconomic data specific to the distribution of population by age and the proximity of youth-related developments (e.g., day care centers and schools) are used to analyze potentially incompatible activities associated with the proposed action.

For purposes of this EA, the ROI for this resource includes the VNTR and communities immediately adjacent to the range boundary that could potentially be affected by Navy and Marine Corps training at the range. To evaluate the effects of the proposed action and no action alternative, minority and low-income populations, as well as the distribution of children adjacent to the VNTR were identified. The nearest populated community on Vieques is Isabel Segunda, at nearly 10 miles (16 km) from the LIA. The population is, for the most part, Hispanic (i.e., a minority population) and as presented in Section 3.2, over 60 percent of the island's population is below the poverty level. The nearest day care centers and/or schools are more than 10 miles (16 km) from the majority of past and present VNTR training activities.

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